



SEQUENCE LISTING

<110> Quinnan, Gerald V.  
Zhang, Peng Fei

<120> Expression and Characterization of HIV-1 Envelope  
Protein Associated with a Broadly Reactive Neutralizing  
Antibody Response

<130> 44508-5001-US

<140> US 09/762,261  
<141> 2001-02-05

<150> US 60/095,267  
<151> 1998-08-04

<150> PCT/US99/17596  
<151> 1999-08-04

<160> 23

<170> PatentIn Ver. 2.1

<210> 1  
<211> 866  
<212> PRT  
<213> Human immunodeficiency virus type 1

<220>  
<223> R2 strain envelope protein (gp 160)

<400> 1  
Met Arg Val Lys Gly Ile Arg Arg Asn Tyr Gln His Trp Trp Gly Trp  
1 5 10 15

Gly Thr Met Leu Leu Gly Leu Leu Met Ile Cys Ser Ala Thr Glu Lys  
20 25 30

Leu Trp Val Thr Val Tyr Gly Val Pro Val Trp Lys Glu Ala Thr  
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Ala  
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro  
65 70 75 80

Gln Glu Val Glu Leu Val Asn Val Thr Glu Asn Phe Asn Met Trp Lys  
85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp  
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu  
115 120 125

Asn Cys Thr Asp Leu Arg Asn Thr Thr Asn Thr Asn Asn Ser Thr Asp  
 130 135 140

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Asn Asn Asn Ser Asn Ser Glu Gly Thr Ile Lys Gly Gly Glu Met Lys  
 145 150 155 160

Asn Cys Ser Phe Asn Ile Ala Thr Ser Ile Gly Asp Lys Met Gln Lys  
 165 170 175

Glu Tyr Ala Leu Leu Tyr Lys Leu Asp Ile Glu Pro Ile Asp Asn Asp  
 180 185 190

Asn Thr Ser Tyr Arg Leu Ile Ser Cys Asn Thr Ser Val Ile Thr Gln  
 195 200 205

Ala Cys Pro Lys Ile Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala  
 210 215 220

Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Ser Gly  
 225 230 235 240

Lys Gly Ser Cys Lys Asn Val Ser Thr Val Gln Cys Thr His Gly Ile  
 245 250 255

Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu  
 260 265 270

Glu Glu Val Val Ile Arg Ser Glu Asn Phe Thr Asn Asn Ala Lys Thr  
 275 280 285

Ile Ile Val Gln Leu Arg Glu Pro Val Lys Ile Asn Cys Ser Arg Pro  
 290 295 300

Asn Asn Asn Thr Arg Lys Ser Ile Pro Met Gly Pro Gly Arg Ala Phe  
 305 310 315 320

Tyr Thr Thr Gly Gln Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn  
 325 330 335

Ile Ser Lys Thr Asn Trp Thr Asn Ala Leu Lys Gln Val Val Glu Lys  
 340 345 350

Leu Gly Glu Gln Phe Asn Lys Thr Lys Ile Val Phe Thr Asn Ser Ser  
 355 360 365

Gly Gly Asp Pro Glu Ile Val Thr His Ser Phe Asn Cys Ala Gly Glu  
 370 375 380

Phe Phe Tyr Cys Asn Thr Thr Gln Leu Phe Asp Ser Ile Trp Asn Ser  
 385 390 395 400

Glu Asn Gly Thr Trp Asn Ile Thr Arg Gly Leu Asn Asn Thr Gly Arg  
 405 410 415

Asn Asp Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Arg  
 420 425 430

Trp Gln Glu Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Lys Gly Asn  
 435 440 445

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Ile Ser Cys Ser Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly  
 450 455 460

Gly Lys Asp Asp Asn Ser Arg Asp Gly Asn Glu Thr Phe Arg Pro Gly  
 465 470 475 480

Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys  
 485 490 495

Val Val Lys Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg  
 500 505 510

Arg Val Val Gln Arg Glu Glu Arg Ala Val Gly Leu Gly Ala Met Phe  
 515 520 525

Phe Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Val  
 530 535 540

Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln  
 545 550 555 560

Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln  
 565 570 575

Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val  
 580 585 590

Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser  
 595 600 605

Gly Lys Leu Ile Cys Thr Thr Val Pro Trp Asn Ala Ser Trp Ser  
 610 615 620

Lys Asn Lys Thr Leu Glu Ala Ile Trp Asn Asn Met Thr Trp Met Gln  
 625 630 635 640

Trp Asp Lys Glu Ile Asp Asn Tyr Thr Ser Leu Ile Tyr Ser Leu Ile  
 645 650 655

Glu Glu Ser Pro Ile Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Glu  
 660 665 670

Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe Asp Ile Ser Asn Trp  
 675 680 685

Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Val Gly  
 690 695 700

Leu Arg Ile Val Phe Val Val Leu Ser Ile Val Asn Arg Val Arg Gln  
 705 710 715 720

Gly Tyr Ser Pro Leu Ser Phe Gln Thr Arg Leu Pro Ala Pro Arg Gly  
 725 730 735

Pro Asp Arg Pro Glu Glu Ile Glu Glu Gly Gly Asp Arg Asp Arg  
740 745 750

Asp Arg Ser Gly Leu Leu Val Asp Gly Phe Leu Thr Leu Ile Trp Val  
755 760 765

Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Leu  
770 775 780

Leu Leu Ile Val Thr Arg Ile Val Glu Leu Leu Gly Arg Arg Gly Trp  
785 790 795 800

Glu Ile Leu Lys Tyr Trp Trp Asn Leu Leu Gln Tyr Trp Ser Gln Glu  
805 810 815

Leu Lys Asn Ser Ala Val Ser Leu Phe Asn Ala Thr Ala Ile Ala Val  
820 825 830

Ala Glu Gly Thr Asp Arg Val Ile Gln Val Leu Gln Arg Val Gly Arg  
835 840 845

Ala Leu Leu His Ile Pro Thr Arg Ile Arg Gln Gly Leu Glu Arg Ala  
850 855 860

Leu Leu  
865

<210> 2

<211> 17

<212> PRT

<213> Human immunodeficiency virus type 1

<220>

<223> segment of R2 strain V3 domain

<400> 2

Lys Ser Ile Pro Met Gly Pro Gly Arg Ala Phe Tyr Thr Thr Gly Gln  
1 5 10 15

Ile

<210> 3

<211> 35

<212> PRT

<213> Human immunodeficiency virus type 1

<220>

<223> R2 strain V3 domain

<400> 3

Cys Ser Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Pro Met Gly Pro  
1 5 10 15

Gly Arg Ala Phe Tyr Thr Thr Gly Gln Ile Ile Gly Asp Ile Arg Gln

20

25

30

Ala His Cys  
35

<210> 4  
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<212> PRT  
<213> Human immunodeficiency virus type 1  
  
<220>  
<223> V3 domain of strain 93TH966.8  
  
<400> 4  
Cys Thr Arg Pro Ser Asn Asn Thr Arg Thr Ser Thr Thr Ile Gly Pro  
1 5 10 15  
  
Gly Gln Val Phe Tyr Arg Thr Gly Asp Ile Thr Gly Asn Ile Arg Lys  
20 25 30

Ala Tyr Cys  
35

<210> 5  
<211> 13  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> Description of Artificial Sequence: derivatives  
of segment of V3 domain in R2 strain  
  
<220>  
<221> VARIANT  
<222> (3)..(12)  
<223> X = any natural or non-natural amino acid.

<400> 5  
Pro Met Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gln  
1 5 10

<210> 6  
<211> 30  
<212> PRT  
<213> Human immunodeficiency virus type 1  
  
<220>  
<223> sequence of Phenetic 1 in V3 region  
  
<400> 6  
Asn Asn Thr Arg Lys Ser Ile His Ile Gly Pro Gly Arg Ala Phe Tyr  
1 5 10 15  
  
Thr Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys

20

25

30

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<210> 7  
<211> 30  
<212> PRT  
<213> Human immunodeficiency virus type 1

<220>  
<223> sequence of Phenetic 2 in V3 region

<400> 7  
Asn Asn Thr Arg Lys Ser Ile Ser Ile Gly Pro Gly Arg Ala Phe Tyr  
1 5 10 15  
Ala Thr Gly Glu Ile Ile Gly Asp Ile Arg Gln Ala His Cys  
20 25 30

<210> 8  
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<212> PRT  
<213> Human immunodeficiency virus type 1

<220>  
<223> sequence of Phenetic 3 in V3 region

<400> 8  
Asn Asn Thr Arg Lys Ser Ile Ser Ile Gly Pro Gly Arg Ala Phe Tyr  
1 5 10 15  
Ala Thr Gly Lys Ile Ile Gly Asp Ile Arg Gln Ala His Cys  
20 25 30

<210> 9  
<211> 30  
<212> PRT  
<213> Human immunodeficiency virus type 1

<220>  
<223> sequence of Phenetic 4 in V3 region

<400> 9  
Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Ala Phe Tyr  
1 5 10 15  
Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys  
20 25 30

<210> 10  
<211> 30  
<212> PRT  
<213> Human immunodeficiency virus type 1

<220>

<223> sequence of Phenetic 5 in V3 region

<400> 10

Asn	Asn	Thr	Arg	Lys	Ser	Ile	His	Ile	Gly	Pro	Gly	Arg	Ala	Phe	Tyr
1				5				10						15	

Ala	Thr	Gly	Lys	Ile	Ile	Gly	Asp	Ile	Arg	Gln	Ala	His	Cys		
				20				25					30		

<210> 11

<211> 30

<212> PRT

<213> Human immunodeficiency virus type 1

<220>

<223> sequence of Phenetic 6 in V3 region

<400> 11

Lys	Asn	Thr	Arg	Arg	Arg	Ser	His	Ile	Gly	Pro	Gly	Arg	Ala	Phe	Tyr
1				5				10					15		

Thr	Thr	Lys	Gln	Ile	Ile	Gly	Asp	Ile	Arg	Gln	Ala	His	Cys		
				20				25					30		

<210> 12

<211> 30

<212> PRT

<213> Human immunodeficiency virus

<220>

<223> sequence of Phenetic 7 in V3 region

<400> 12

Asn	Asn	Thr	Arg	Thr	Ser	Ile	Thr	Ile	Gly	Pro	Gly	Gln	Val	Phe	Tyr
1					5				10				15		

Arg	Thr	Gly	Lys	Ile	Ile	Gly	Asp	Ile	Arg	Gln	Ala	His	Cys		
				20				25					30		

<210> 13

<211> 30

<212> PRT

<213> Human immunodeficiency virus type 1

<220>

<223> sequence of Phenetic 8 in V3 region

<400> 13

Lys	Lys	Met	Arg	Thr	Ser	Ala	Arg	Ile	Gly	Pro	Gly	Arg	Val	Phe	His
1					5				10				15		

Lys	Thr	Gly	Asp	Ile	Ile	Gly	Ser	Ile	Thr	Lys	Ala	Tyr	Cys		
				20				25					30		

<210> 14  
<211> 29

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<212> PRT

<213> Human immunodeficiency virus type 1

<220>

<223> sequence of Phenetic 9 in V3 region

<400> 14

Asn Asn Thr Arg Gln Ser Thr His Ile Gly Pro Gly Gln Ala Leu Tyr  
1 5 10 15

Thr Thr Asp Ile Ile Gly Lys Ile Arg Gln Ala His Cys  
20 25

<210> 15

<211> 29

<212> PRT

<213> Human immunodeficiency virus type 1

<220>

<223> sequence of Phenetic 10 in V3 region

<400> 15

Asn Asn Thr Arg Gln Gly Thr His Ile Gly Pro Gly Arg Ala Tyr Tyr  
1 5 10 15

Thr Thr Asn Ile Ile Gly Asp Ile Arg Gln Ala His Cys  
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<210> 16

<211> 29

<212> PRT

<213> Human immunodeficiency virus

<220>

<223> sequence of Phenetic 11 in V3 region

<400> 16

Asn Asn Thr Arg Gln Arg Thr Ser Ile Gly Gln Gly Gln Ala Leu Tyr  
1 5 10 15

Thr Thr Glu Ile Arg Gly Asp Ile Arg Gln Ala Ala Cys  
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<210> 17

<211> 30

<212> PRT

<213> Human immunodeficiency virus type 1

<220>

<223> sequence of Phenetic 12 in V3 region

<400> 17  
Asp Asn Ile Lys Ile Gln Arg Thr Pro Ile Gly Gln Gly Gln Ala Leu  
1 5 10 15

Tyr Thr Thr Arg Ile Thr Gly Tyr Ile Gly Gln Ala His Cys  
20 25 30

<210> 18  
<211> 29  
<212> PRT  
<213> Human immunodeficiency virus type 1

<220>  
<223> sequence of Phenetic 13 in V3 region

<400> 18  
Gln Asn Lys Arg Gln Gly Thr Pro Ile Gly Leu Gly Gln Ala Leu Tyr  
1 5 10 15

Thr Thr Arg Ile Lys Gly Asp Ile Arg Lys Ala His Cys  
20 25

<210> 19  
<211> 30  
<212> PRT  
<213> Human immunodeficiency virus type 1

<220>  
<223> sequence of Clade A in V3 region

<400> 19  
Asn Asn Thr Arg Lys Ser Val His Ile Gly Pro Gly Gln Ala Phe Tyr  
1 5 10 15

Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys  
20 25 30

<210> 20  
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<212> PRT  
<213> Human immunodeficiency virus type 1

<220>  
<223> sequence of Clade B in V3 region

<400> 20  
Asn Asn Thr Arg Lys Ser Ile His Ile Gly Pro Gly Arg Ala Phe Tyr  
1 5 10 15

Thr Thr Gly Glu Ile Ile Gly Asp Ile Arg Gln Ala His Cys  
20 25 30

<210> 21

<211> 30  
<212> PRT  
<213> Human immunodeficiency virus type 1

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<220>  
<223> sequence of Clade C in V3 region

<400> 21  
Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Thr Phe Tyr  
1 5 10 15  
Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys  
20 25 30

<210> 22  
<211> 29  
<212> PRT  
<213> Human immunodeficiency virus type 1

<220>  
<223> sequence of Clade D in V3 region

<400> 22  
Asn Asn Thr Arg Gln Arg Thr His Ile Gly Pro Gly Gln Ala Leu Tyr  
1 5 10 15  
Thr Thr Arg Ile Ile Gly Asp Ile Arg Gln Ala His Cys  
20 25

<210> 23  
<211> 30  
<212> PRT  
<213> Human immunodeficiency virus type 1

<220>  
<223> sequence of Clade E in V3 region

<400> 23  
Asn Asn Thr Arg Thr Ser Ile Thr Ile Gly Pro Gly Gln Val Phe Tyr  
1 5 10 15  
Arg Thr Gly Asp Ile Ile Gly Asp Ile Arg Lys Ala Tyr Cys  
20 25 30